



Flood Cleanup: *How to Avoid Indoor Air Quality Problems*

What is the issue?

Clean up should begin as soon as it is safe to return to the building. Prompt and proper clean up is important for your health. Flood waters can contain microorganisms (such as bacteria, molds, and viruses), raw sewage, dead animals, and other debris. It is important to remove such debris and/or contaminated materials from your home as quickly as possible. Poor indoor air quality can result if materials are not cleaned properly or discarded promptly and can lead to ongoing contamination of your indoor air by microorganisms. Poor indoor air quality can lead to various health issues including respiratory problems, allergies, and can continue to damage building materials long after the flood waters have receded.

How to avoid problems due to microbial growth?

Remove water: All water should be pumped, swept, or otherwise removed from inside of the building. Any debris, such as tree branches, garbage, and mud, should also be removed at this time. It is also a good idea to remove furniture, carpets and other items that were wet or damaged by the flood waters. These materials, once wet, may contain contamination. By removing the wet or damaged materials that may contain health hazards, you are effectively removing the microorganisms. This is also the time when leaky roofs, broken windows, or other areas where water may leak into the home should be patched or fixed to eliminate possible future water damage.

Completely dry out your house/building: The drying process is extremely important because many of the microorganisms, which can cause health effects, need moist environments to survive. Thoroughly dry the building. Drying can usually be successful during the first 24 to 48 hours following water contamination. This process should include the use of fans if it is safe to use electricity and the opening of windows to increase air circulation, ventilation, and drying. Dehumidifiers should be used with windows and doors closed. It may be necessary to remove portions of walls, ceilings, and floors to fully accomplish a complete drying out of the house. Certain building materials (for example, wallboard, fiberglass, insulation, and wall-to-wall carpeting) that were soaked only with clean rain water may be able to be saved if dried properly and completely. You may, however, want to consider removing and replacing them to avoid possible future indoor air quality problems, especially if the beginning of the drying process was delayed for more than 48 hours. The drying process should continue for days to weeks until materials are thoroughly dry (not just to the touch) and humidity levels return to normal (35-55%). Humidity levels are important to monitor, since the growth of microorganisms will continue as long as humidity levels are high. If the house is not dried properly, a musty odor, signifying growth of microorganisms, can remain long after the flood.

Clean all surfaces: The walls, floors, studs, closets, shelves, contents, in fact, every flooded part or item in your house, should be thoroughly washed and disinfected. Bleach, mildew removers, disinfectants, such as quaternary, phenolic, or pine oil based cleaners, and non-sudsing household cleaners should be used. It is important to read the label on every cleaner and use the appropriate safety methods. This includes such things as wearing gloves, eye protection, providing proper ventilation, and not mixing different household cleaning agents. Mixing certain types of products, such as bleach and ammonia, can produce toxic fumes and result in injury and even death. As household cleaning agents contain chemicals that may be harsh, care should be exercised when cleaning items.

Remove and discard items that can not be dried and cleaned effectively: It can be difficult to throw away items in a home, particularly those with sentimental value. However, keeping certain items that were soaked with water may be harmful to your health. As a general rule: Materials that are wet and cannot be thoroughly cleaned and dried should be discarded, as they can remain a source of microbial growth. In addition, fiberboard, fibrous insulation, and disposable filters in your heating and air conditioning system should be replaced if they are in contact with water. The heating and air conditioning ducts will also need to be cleaned if they contacted water.

Avoid carbon monoxide danger

Carbon monoxide (CO) is a colorless, odorless, gas that can be lethal at high levels. Carbon monoxide levels can build up rapidly if certain types of combustion devices (for example, gasoline-powered generators, camp stoves and lanterns, or charcoal-burning devices) are used indoors. Do not use combustion devices designed for outdoor use indoors.

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DRINKING WATER

What should I do?

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST! Bring all water to a boil, let it boil for one minute, let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes and food preparation until further notice. Boiling kills bacteria and other organisms in the water.

What happened to my drinking water?

Bacterial contamination can occur when increased run-off enters the drinking water source (for example, following heavy rains and floods). It can also happen due to a break in the distribution system (pipes) or a failure in the water treatment process.

What should I do to correct the problem if I have a private well?

The Division of Public Health recommends that a licensed plumber or well driller be contacted to chlorinate your well and disinfect it.

What is being done to correct the public water problem?

The water system is increasing the chlorine level in the distribution system and will inform you when tests show no bacteria, and you no longer need to boil your water. We anticipate in resolving the problem within a two-week period.

What are coliform bacteria?

Coliform bacteria are a natural part of the intestinal tract of warm blooded mammals, including man. Coliform bacteria can also be found in soil, other animals and insects. They are used as an indicator that other, potentially harmful, bacteria may be present.

What is E. coli?

Fecal coliforms and E.coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, and people with severely compromised immune systems.

Who can I call if I have further questions?

Contact the Division of Public Health Office of Drinking Water at (302) 741-8630.

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FLOOD CLEAN UP: HOW TO AVOID INDOOR AIR QUALITY PROBLEMS

When should clean up begin?

Clean up should begin as soon as it is safe to return to the building. Prompt and proper clean up is important for your health. Floodwaters can contain microorganisms (such as bacteria, molds, and viruses), raw sewage, dead animals, and other debris. It is important to remove such debris and/or contaminated materials from your home quickly.

If materials are not cleaned properly or discarded promptly, poor air quality can result. Microorganisms can contaminate indoor air and cause respiratory problems and allergies. They can continue to damage building materials long after the flood waters recede.

How can homeowners avoid problems due to microbial growth?

Remove water:

Pump, sweep, or drain water from the building. Remove tree branches, garbage, mud and other debris. It is a good idea to remove furniture, carpets and other household items that were wet or damaged by the floodwaters. Wet and contaminated materials contain microorganisms that contaminate indoor air. Patch or fix leaky roofs, broken windows, and other places to prevent leaks.

Completely dry out your house/building:

The drying process is extremely important because most microorganisms survive in moist environments. Thoroughly dry the building during the first 24 to 48 hours after the water enters the structure. Use fans if it is safe to use electricity. Open windows to increase air circulation, ventilation and drying. Use dehumidifiers with windows and doors closed.

It may be necessary to remove portions of walls, ceilings, and floors to completely dry out the house. Wallboard, fiberglass, insulation and wall-to-wall carpeting that were soaked only with clean rainwater may be able to be saved, if they are dried properly and completely. Consider removing and replacing those materials to avoid future indoor air quality problems, especially if the drying process did not begin within 48 hours.

Continue the drying process for days or weeks until materials are thoroughly dry (not just to the touch), and humidity levels return to normal (35-55%). Humidity levels are important to monitor, since microorganisms thrive in humid environments. There should not be a musty odor if the house is dried completely and properly.

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Clean all surfaces:

Thoroughly wash and disinfect the walls, floors, studs, closets, shelves, contents, and every flooded part of your house. Use bleach, mildew removers, non-sudsing household cleaners and disinfectants such as quaternary, phenolic, or pine oil based cleaners.

Read the label on every cleaner and use the appropriate safety instructions, such as wearing gloves and eye protection, providing proper ventilation, and not mixing different household cleaning agents. Mixing certain products, such as bleach and ammonia, can produce toxic fumes and result in injury and even death. Exercise care when cleaning items, since household cleaning agents can be harsh.

Remove and discard items that cannot be dried and cleaned effectively:

It can be difficult to throw away water-damaged household items, especially if they hold sentimental value. However, keeping certain items that were soaked with water could be harmful to your health, as they are a source of microbial growth. Generally, discard wet materials that cannot be thoroughly cleaned and dried.

Replace fiberboard, fibrous insulation and disposable filters in your heating and air conditioning system if they contacted water. The heating and air conditioning ducts will also need to be cleaned if they contacted water.

Avoid Carbon Monoxide

Carbon monoxide (CO) is an odorless, colorless gas that can be lethal at high levels. Dangerous carbon monoxide levels can build up rapidly if combustion devices are used indoors. Gasoline-powered generators, camp stoves, grills, lanterns and charcoal-burning devices are designed for outdoor use only. Do not use these indoors.

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Reopening a Food Establishment After Hurricanes and Flooding

Following a natural disaster, there are potential health concerns that can be created by the disruptions caused by the disaster. This publication provides food safety suggestions and information for retail and food service establishments resuming business in the aftermath of natural or other disasters. Prior to reopening, establishment persons-in-charge (PICs) should conduct a complete self-inspection to ensure that normal operations can be resumed safely and without compromising food safety. **Establishments required to cease operations in an emergency or those affected by a natural disaster should not re-open until authorization is granted by the Division of Public Health.**

Do not enter a flood damaged building where there is potential for hazardous materials or gas leaks within the building, until the building has been cleared by a hazardous materials (HAZMAT) team. For exposures to mold-contaminated materials/environments, or other recognized hazards, NIOSH approved respirators may be necessary. If entering and cleaning a building, refer to [NIOSH protective equipment guidance](#).

Decontamination and sanitization procedures using chemical sanitization, e.g., chlorine bleach at a concentration of 100-200 ppm (1 tablespoon of bleach in 1 gallon of potable water), Quaternary Ammonium at a concentration of 200 ppm, or other approved sanitizers, should be used on equipment and structural surfaces that are salvageable. When you decontaminate, do so in a manner that eliminates any harmful microorganisms, chemical residues, or filth that could pose a food safety risk.

Pest Control

- Ensure that any rodents/pests that may have entered the facility are no longer present. Remove dead pests and sanitize any food-contact surfaces that have come in contact with pests.
- Seal all openings into the facility to prevent future entry of pests, or rodents.
- Dispose of contaminated or spoiled solid foods in closed containers for removal to prevent rodent and fly harborage.

Damaged Food Products

- Discard all food and packaging materials that have been submerged in flood waters, unless the food is sealed in a hermetically sealed can that has not been damaged.
 - Destroy refrigerated and frozen foods, such as meat, poultry, shell eggs, egg products, and milk, which have been immersed in flood waters.
 - Good advice is: **If in doubt, throw it out.**

- Do not recondition products in containers with screw-caps, snap-lids, crimped-caps (soda pop bottles), twist-caps, flip-top, snap-open, and similar type closures that have been submerged in flood waters.
- Do not salvage food packed in plastic, paper, cardboard, cloth, and similar containers that have been water damaged.
- Undamaged, commercially prepared foods in all-metal cans or retort pouches can be saved if you remove labels that can come off, thoroughly wash the cans, rinse them, and then disinfect them with a sanitizing solution consisting of 1 tablespoon of bleach per gallon of potable water. Finally, re-label containers that had the labels removed, including the expiration date, with a marker.
- Complete proper and safe disposal of condemned food items in a manner consistent with federal, state, and local solid waste storage, transportation, and disposal regulations, to ensure these products do not reappear as damaged or salvaged merchandise for human consumption.

Physical Facilities

- If you have a well that has been flooded, the water should be disinfected and tested to confirm it is safe after flood waters recede. If you suspect that your well may be contaminated, contact your local or state health department or agriculture extension agent for specific advice.
- Thoroughly wash all physical facility interior surfaces (e.g., floors, walls, and ceilings), using potable water, with a hot detergent solution, rinsed free of detergents and residues, and treated with a sanitizing solution.
- Mold contamination is a concern. Structural components of the building (e.g., walls, piping, ceiling, and HVAC system/ventilation systems) affected by flood waters or other damage from the hurricane, should be cleaned, repaired, and disinfected, where possible. Remove and destroy wall board that has been water damaged. Cement walls that have mold damage can be reconditioned.
- Any exhaust systems and hoods should be thoroughly cleaned and freed of any debris. Consult professional service technicians, as needed. Water damaged ventilation systems that cannot be thoroughly cleaned and sanitized should be removed and replaced. In all cases, replace all ventilation air filters.

Equipment

- Thoroughly wash metal pans, ceramic dishes, and utensils (including can openers) with soap and hot water. Rinse, and then sanitize them by boiling in potable water or immersing them for 15 minutes in a solution of 1 tablespoon of unscented, liquid chlorine bleach per gallon of drinking water or other approved sanitizer. Follow instructions on the sanitizer label for appropriate concentration.
- Thoroughly wash countertops, equipment and non-food contact surfaces with soap and hot water. Rinse, and then sanitize by applying a solution of 1 tablespoon of unscented, chlorine bleach per gallon of drinking water or other approved sanitizer. Allow to air dry.

A dishwasher or 3-compartment sink should be used to wash, rinse, and sanitize equipment and utensils using potable water, and:

- Chlorine bleach at a concentration of 50-100 ppm or other approved sanitizers should be provided for sanitizing food contact surfaces and equipment.
- Mechanical dishwashing machines should provide a final, sanitizing rinse of either 50 ppm chlorine (for chemical sanitizing machines) or 180°F final sanitizing rinse (for hot water sanitizing machines).
- An approved test kit should be available to ensure appropriate sanitizer strength for chemical sanitizing and a maximum registering thermometer or temperature sensitive tape should be available to check that the hot water reaches 180°F or the utensil surface reaches a temperature of 165°F.
- Run the empty dishwasher through the wash-rinse-sanitize cycle three times to flush the water lines and assure that the dishwasher is cleaned and sanitized internally before washing equipment and utensils in it.
- Refrigerated display and storage cases and other refrigerator equipment used to store food should be cleared of all contaminated products and their juices prior to cleaning.
- Refrigerated storage equipment should be thoroughly washed inside and outside with a hot detergent solution and rinsed free of detergents and residues. (Special attention should be given to lighting, drainage areas, ventilation vents, corners, cracks and crevices, door handles and door gaskets.) Treat all clean surfaces with a sanitizing solution.
- If the insulation, door gaskets, hoses, etc. are damaged by flood or liquefied food items, then replace or discard these refrigerated display cases and storage cases and other refrigerator equipment.
- All filters on equipment should be removed and replaced if not designed to be cleaned in place.
- Replace all ice machine filters and beverage dispenser filters, and flush all water lines, including steam water lines and ice machine water lines, for 10 to 15 minutes.
- Discard all ice in ice machines; clean and sanitize the interior surfaces (ice making compartment and storage bin); run the ice through 3 cycles; and discard ice with each cycle.
- All sinks should be thoroughly cleaned and sanitized before resuming use.
- Equipment should be inspected to ensure it is operational and that all aspects of its integrity are maintained.
- Stove units should be thoroughly cleaned and checked by the fire department, local utility company, or authorized service representative prior to use.

Maintaining Food Temperatures

- Verify that all open-top and refrigerated and freezer display cases, walk-in refrigerators, and walk-in freezers are capable of consistently maintaining cold holding temperatures ($\leq 41^{\circ}\text{F}$ or in a frozen state) before food items are placed in the units.
- Ensure that the equipment can heat to the appropriate cooking temperature hot ($\geq 135^{\circ}\text{F}$) for raw animal foods and to cool to maintain potentially hazardous foods cold at the appropriate ($\leq 41^{\circ}\text{F}$) temperature.
- Verify that all equipment used for food preparation (e.g., cooking, cooling, and reheating) is functioning and properly calibrated prior to use.

Employees

- Put fewer items on the menu when only a limited number of trained employees are available and working. A full menu may be offered when there is an adequate number of trained employees to staff each area of the operation during normal working hours.
- Soap and potable running, warm water (at least 100°F) should always be used to wash hands. Alcohol hand gels may only be used **after handwashing**. Alcohol hand gels are ineffective against bacteria on soiled hands and do not substitute for handwashing.
- Employees should not touch ready-to-eat foods with their bare hands, but instead should use tongs, deli paper, or single-use, disposable gloves.
- Remember:
 - Employees with open wounds should not work with hands-on preparation of foods or with cleaned and sanitized food contact surfaces or single-service/single-use utensils. If these infected wounds are covered with a double, water-proof barrier such as a finger cot or water-tight bandage and plastic gloves, the employee may continue to work with food.
 - Employees sick with vomiting, diarrhea or jaundice should not be working in the establishment and may not return to work until at least 24 hours after the symptoms cease.

Food Source and Receipt

- All foods, including raw, fresh, frozen, pre-packaged, shelf-stable, and ready-to-eat foods, should only be received from a licensed and an approved food source. This includes food distributors and vendors licensed by the local or state regulatory food authority.
- Food should be received by a person who is responsible for ensuring that food packages meet temperature requirements and are intact with no breaks, seams, or other openings. Canned foods should not be swollen or have any dents or punctures in the cans.
- Foods requiring temperature control should be received in a frozen state or at temperatures less than 41°F for refrigerated storage.



Food Safety for Consumers Returning Home After a Hurricane and Flooding

To reduce the risk of foodborne illness after a hurricane or flooding, consumers must thoroughly examine all food to decide what to discard. Food preparation areas and equipment must also be cleaned and sanitized. Since flooding can contaminate public water supplies and wells, use only safe water for cleaning up.

WHAT FOOD AND CONTAINERS MAY BE SAFE TO KEEP?

Always Remember - When In Doubt, Throw It Out

- Discard exposed food that may have come into contact with flood water. Discard perishable food if not refrigerated for more than 4 hours. Do not eat food in porous wrapping – cardboard, cloth, and similar materials - if water damaged.
- Discard food and beverage containers that cannot be disinfected if they have come in contact with flood water, including food in containers with screw-on caps, snap-off lids, crimped or twist-off caps, flip tops, and all home canned foods.
- Undamaged, commercially-prepared foods in all-metal cans or retort pouches can be saved if you remove the labels, thoroughly wash the containers, rinse and then disinfect them with a sanitizing solution consisting of 1 tablespoon of bleach per gallon of potable water. Finally, re-label containers that had the labels removed, including the expiration date, with a marker.

HOW DO I CLEAN FOOD CONTACT SURFACES AND EQUIPMENT?

- When cleaning or disinfecting, wear protective clothing, such as gloves, to avoid skin contact, irritation, or infection.
- Discard items that cannot be safely cleaned, including wooden cutting boards, wooden dishes and utensils, plastic utensils, baby bottle nipples and pacifiers that have come into contact with flood water.
- Thoroughly wash pans, dishes and utensils with hot soapy water. Rinse and sanitize them by boiling in clean water or by immersion for 15 minutes in a solution of 1 tablespoon of unscented chlorine bleach per gallon of clean water.
- Thoroughly wash countertops with hot soapy water. Rinse, then sanitize by spraying or wiping with a solution of 1 tablespoon of unscented chlorine bleach per gallon of clean water. Allow food contact surfaces to air dry without wiping.
- Clean and disinfect the interiors of dishwashers and ice makers after flushing the water supply lines with potable water through at least three machine cycles.

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POWER FAILURE: HOW TO PROTECT FOODS

WHAT IS THE FIRST THING I SHOULD DO IF THE POWER GOES OUT?

Keep the refrigerator and freezer doors closed as much as possible to maintain the cold temperature. Obtain dry or block ice to keep your refrigerator cold. Fifty pounds of dry ice should hold an 18-cubic foot full freezer for two days. Plan ahead and know where dry ice and block ice can be purchased.

Coolers are a great help for keeping food cold if the power will be out for more than 4 hours – have a couple on hand along with frozen gel packs. When your freezer is not full, keep items close together – this helps the food stay cold longer. Refrain from batch cooking that requires cooling down under refrigeration. Also make arrangements for a generator hookup, refrigerated trailers on site, or to relocate product to refrigerated storage.

WHAT FOODS SHOULD I BE CONCERNED ABOUT?

Foods that are potentially hazardous are the most important. These are meats, fish, poultry, all dairy products, all eggs and egg products, soft cheeses, cooked beans, cooked rice, cooked potatoes, cooked pasta, potato/pasta/macaroni salads, custards, puddings, etc. Some foods in commercial packaging that do not require refrigeration are safer. These are carbonated beverages, unopened bottled juices, ketchup, mustard, relishes, jams, peanut butter, barbeque sauces, etc.

WHEN DO I SAVE AND WHEN DO I THROW OUT?

Refrigerated foods should be safe as long as the power is not out more than four hours and the refrigerator doors have been kept closed. Check foods with a thermometer - potentially hazardous foods should be discarded if they are above 41°F for more than four hours.

Frozen foods that are still frozen are no problem. If potentially hazardous foods are thawed but are still cold or have ice crystals on them you should use them as soon as possible. You may refreeze them without risk of disease but quality of the product may be compromised. If potentially hazardous foods are thawed and warmer than 41°F you should discard them. Do not refreeze! You cannot rely on appearance or odor. Never taste the food to determine its safety. Some foods may look and smell fine, but if they have been warm for too long, the bacteria may have grown enough to make you sick.

WHAT HAPPENS WHEN THE POWER GOES BACK ON?

Allow for refrigerators to reach proper temperature less than 41°F before restocking. Digital, dial, or instant-read food thermometers will help you know if the food is at safe temperatures. Always keep appliance thermometers in the refrigerator and freezer. Time as Public Health Control: the 4-hour safety limit starts when product reaches 41°F internal temperature. Note the time and mark food container with time to consume or discard.

CAUTION: DRY ICE
BE CERTAIN OF GOOD VENTILATION IN THE ROOM.
CARBON DIOXIDE GAS CAN ACCUMULATE AND CAUSE
LOSS OF CONSCIOUSNESS AND ASPHYXIATION.



DRINKING WATER AND WASTEWATER: FLOOD RECOVERY

When flooding disrupts drinking water supplies or covers plumbing fixtures, dirty water can back-siphon into home plumbing and into homes or buildings. When sewage or septic systems back up, they contaminate structures.

Floodwaters are considered to be contaminated because they carry sewage and other pollutants. This type of contaminated water is commonly referred to as brown or black water. As floodwaters rise and spread, the contaminated water flows into structures, bringing disease-causing organisms.

Materials contaminated with brown or black water present an acute health risk if they are not properly cleaned and removed. Viruses, bacteria, protozoans and worms in the floodwater or in its debris can cause disease.

What are the hazards and what can they do?

Human waste contains many organisms that can cause disease. These organisms reside in the digestive tract and intestines of people where they may not cause any adverse health effects. Human “carriers” exist for all types of diseases. A proportion of those carriers excrete the disease-causing organisms in their feces. If a person contacts items contaminated by sewage, they could become ill with intestinal diseases.

Disease transmission factors

A more common problem associated with exposure to contaminated floodwaters is wound infection. People contacting floodwaters or areas contaminated by floodwaters should follow good personal hygiene. If they have a wound or other break in the skin, they should seek prompt medical care. The most common source of *Clostridium tetani*, the bacteria that causes tetanus, is human feces. Contaminated floodwaters may also contain infectious strains of *E. coli*, such as antibiotic resistant *E. coli*.

Cleanup

Minimize the risk of disease by properly cleaning areas contaminated by sewage backup or floodwaters. Clean floors with a 10% bleach solution (or other comparable commercially available disinfectant). Replace contaminated carpets or have them cleaned by a professional cleaning contractor. Do not mix bleach with household cleaning products.

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Wash contaminated skin thoroughly with warm soapy water for a minimum of ten (10) minutes. Persons with weakened immune systems are at increased risk from exposure to brown or black water. Contaminated laundry should be either be bagged and properly disposed; or washed separately in hot water with a 10% bleach solution. Some professional cleaners may be able to clean contaminated clothing.

If you are served by a public water system, thoroughly flush all water lines, including hot water lines. Ask your water company if they are disinfecting the water lines. You may notice a strong odor of chlorine while this is occurring. Only use the water for cooking, drinking or washing when the water company says it is safe to do so.

If you have a private well, call an electrician to ensure it is safe to turn the well pump back on. Have a licensed plumber or well driller disinfect your well and flush hot and cold water lines inside the house or building. Test it for bacteria and nitrates before using the water for cooking, drinking or washing. For information on sampling and testing your well, contact the Office of Drinking Water at (302) 741-8630.

Storm water

Do not allow children to play in or around storm water collection drains or outfalls, or in water of questionable origin. In some locations, during periods of heavy rain, raw sewage overflows contaminate storm water systems. Additionally, storm water runoff may be contaminated with fecal matter from pets or agricultural animals. Their fecal matter is also capable of transmitting many of the diseases outlined above.

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Frequently Asked Questions

Tetanus (Lockjaw)

What is Tetanus?

Tetanus or lockjaw is an acute, often fatal disease, caused by a toxin produced by the bacteria, *Clostridium tetani*.

How does someone get Tetanus?

The bacteria that causes tetanus, is naturally occurring in the soil. Any wound or cut contaminated with the soil, such as a puncture wound or even a pin prick, can provide a suitable environment for the bacteria. This disease is usually acquired when a person who has not been immunized acquires a wound by stepping on a dirty nail or being cut by a dirty tool. The bacteria infect the wound and produce a toxin that spreads through the blood, causing severe muscle spasm, paralysis and frequently death. The bacteria cannot survive in the presence of oxygen. They are also resistant to heat and the usual antiseptics.

Who can get tetanus?

Anyone who gets a wound or cut, if not properly immunized against tetanus, is at risk.

What are the symptoms?

The most common type of tetanus is the generalized form: the first sign is lockjaw or spasms of the muscles of the jaw. It is then followed by stiffness of the neck, difficulty in swallowing, and rigidity of the abdominal muscles. Spasms may occur frequently and may continue for 3-4 weeks. Complete recovery may take months.

How soon do symptoms appear?

It usually takes about 8 days for symptoms to start, with a range of 3-21 days.

How is it treated?

Antibiotics are not helpful in treatment of tetanus. Immunization is the most important treatment. Tetanus Immune Globulin (TIG) is recommended for persons with tetanus. Active immunization with tetanus toxoid should begin as soon as the person's condition has stabilized. Persons who have an uncertain history of prior immunization against tetanus need tetanus immune globulin (TIG) as well as tetanus toxoid.

What should I do if I get a puncture wound?

Minor wounds: Clean the wound thoroughly with soap and warm water. Leave the wound uncovered, if possible.

Severe injuries: See a health care provider for evaluation and treatment

Be aware of any signs of infection such as redness, warmth, swelling, tenderness, or fever. If signs of infection develop, consult your health care provider.

If I am injured, how do I know if I need a tetanus shot?

For a **minor injury** - Get a tetanus shot if your last tetanus shot was over 10 years ago.

For a **complicated or contaminated wound (including puncture wounds)** - Get a tetanus shot if your last tetanus shot was over 5 years ago.

How do I prevent the disease?

Tetanus can be prevented with a vaccine. Children who are less than 7 years of age can receive DTaP vaccine - a combined vaccine against diphtheria, tetanus and pertussis (whooping cough). Teenagers and adults should receive booster doses of Td vaccine, a combined vaccine against tetanus and diphtheria every 10 years.

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